

(Since Sandee Dingman was not able to attend the park scoping workshop she provided these comments separately.)

**Worksheet to Identify Potential Indicators for Ecological Monitoring**

You return to visit your park in 20 years and walk through the park with the current resource manager. The manager tells you about the current condition of the natural resources, the management issues, and threats of the day. What would that person describe to you?

(IN REGARDS I'M LOOKING FOR THINGS LIKE SODBUSTING ALONG A BORDER, INCREASE USE OF PESTICIDES ETC., MORE DEVELOPMENT [LIKELY NOT AN ISSUE AT BADLANDS!])

- *invasive plants species, especially moving up Sage Creek from Cheyenne River*
- *lack of resident grazing (i.e., bison) on most of park – changes in plant species composition, maybe loss of seed banks*
- *heavy metal deposition as well as increase NO, SO, VOcs from Power River Basin development*
- *reduced native plant diversity*

What are the communities at your park (e.g., native mixed-grass prairie, barren badlands topography, prairie stream, forested riparian area) and approximate percentage of total area?

(WE HAVE THE VEG MAPS OF COURSE SO I'M ONLY LOOKING FOR SMALL [LESS THAN 0.5 ACRE] SITES OF UNIQUE VEGETATION OR RESOURCES)

- *springs – CCC spring complex along edge of Quinn Table, springs along edge of Carey Table, maybe a few hundred years old*
- *rare plant populations*
- *juniper slumps – naturally isolated from fire*

What are the park's most significant natural resources (e.g., the river and its tributaries, caves and cave fauna, rare plant communities, elk herd)?

(IN YOUR OPINION)

- *native mixed grass prairie w/most of the flora and fauna species*
- *fossils*

What does your park contribute to regional biological diversity (e.g., what natural resources are preserved and protected at your park that are altered or threatened throughout the rest of the region)?

(E.G., RARE PLANTS OR PLANT COMMUNITIES, PERHAPS A LIGHTLY GRAZED CONDITION IN A HEAVILY GRAZED LANDSCAPE)

*a no grazed environment and a lightly grazed environment (everything around us is in rotation)*

What park-specific legislative mandates direct the park to monitor a particular natural resource at your park.

*Wilderness enabling legislation*

What federally-listed threatened and endangered species are known to occur in the park?

(I ASSUME THIS IS NONE FOR BADL)

*no plants*

What state-listed threatened and endangered species are known to occur in the park?

*State listed plants: Astragalus barrii, Eriogonum visheri, Townsendia exscarpa, Lesquereel arenas as var. argillos, Chrysothamnus parry*

(WE CAN GET THIS BUT I ASK PARKS JUST TO SEE IF OUR RECORDS JIVE  
[AND TO SEE IF THEY HAVE ANY SENSE WHAT THEY HAVE!!!])

What is that status of your park's management plans?

(I'LL GET THIS FROM BRIAN ET AL.)

- *Draft GMP soon to be finalized*
- *Out of date RMP*
- *Out of date Strategic Plan*
- *New weed mgt plan*

What is currently being monitored at or near the park by NPS or other entities (e.g., plants by fire effects program, plants by LTEM, exotic plants by exotic plant teams, birds by Breeding Bird Survey, butterflies, stream by USGS, Christmas bird count, weather data, NRCS photography, visitors by park staff, state roadside counts --- use the checklist below)?

(FILL IT IN FOR PLANTS AND WHATEVER OTHER PROGRAMS YOU WORK WITH)

*Air: NPS of BADL: Cedar Pass IMPROVE, Transmissometer, continuous ozone, SDDEWR at BADL: particulates at Cedar Pass, 2<sup>nd</sup> IMPROVE at Conata Rd (temporary\_*

Amphibian:

Birds:

*Fire: fire effects monitoring program, some small "research" data sets – Whisenart, Buenber, Hall-Sieg*

Fish:

Geology:

Mammals:

*Meteorology: 2 RAWS at Stronghold and Pinnacles, new weather station at Cedar Pass ozone full met station at Cottonwood Research Station (USDA)*

*Pests: noxious weeds – park and EPMT, grasshoppers SD Dept. of Ag, gypsy moths – USDA, tamarisk in Cheyenne and White Rivers – SD Dept. of Ag*

Pesticides

Reptiles:

Soils: *no monitoring per se, but we are supposedly in line to get a consolidated soil survey thru the NPS soil science program*

Sound: *1999 Foch Study, new study in fall 03 for Air Tour Mgmt Plan, some old data from 1994-1995 effort – no analysis*

Vegetation: *Various research projects – Larson's yellow sweetclover, veg map, Butler and Batt transects est in 1991*

Visitors

Visual Landscape:

Water Quality: *USGS stations on White River and Cheyenne River*

Wildlife or Plant Disease: *No ongoing monitoring of plant disease*

What are the stressors on park resources? What are the sources of each stressor?

(TO THE BEST OF YOUR KNOWLEDGE)

For your park, what are some monitoring questions relating to natural resource threats (e.g., does the water quality of Cub Creek meet EPA's Clean Water standards? Are exotic

plants displacing native species in prairie remnants? Is urban encroachment changing deer populations within the park? Is prescribe fire working to ???)?

(IN THE FORM OF A QUESTION, IF POSSIBLE)

What potential management actions in the future may require monitoring (e.g., potential species reintroductions, land acquisitions, commercial uses)?

What would your partners like you to monitor?

What current research is occurring at the park (research differs from monitoring in that it is typically of shorter duration, say 2-3 years)? Investigator. Title.

(IN REGARDS TO PLANTS AND OTHER ISSUES YOU DEAL WITH)

Vital signs are: 1) sensitive enough to provide early warning of change, 2) have low natural variability, 3) can be accurately and precisely measured, 4) have costs and effort of measurement that are not prohibitive, 5) have monitoring results that can be interpreted and explained, 6) are low impact to measure, and 7) have measurable results that can be replicated with various personnel. Off the top of your head, look into your crystal ball and choose several vital signs to monitor over time to track the condition of natural resources within your park (items can range from broad, e.g., the stream, to narrow, e.g., a particular species). What are those vital signs? Rank them in order of importance.